A REVIEW OF *TAENARIS* HÜBNER (LEPIDOPTERA: NYMPHALIDAE: AMATHUSIINAE) IN QUEENSLAND, TOGETHER WITH FIRST AUSTRALIAN RECORDS FOR *T. MYOPS KIRSCHI* STAUDINGER AND *ELYMNIAS AGONDAS MELANIPPE* GROSE-SMITH (SATYRINAE)

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Abstract

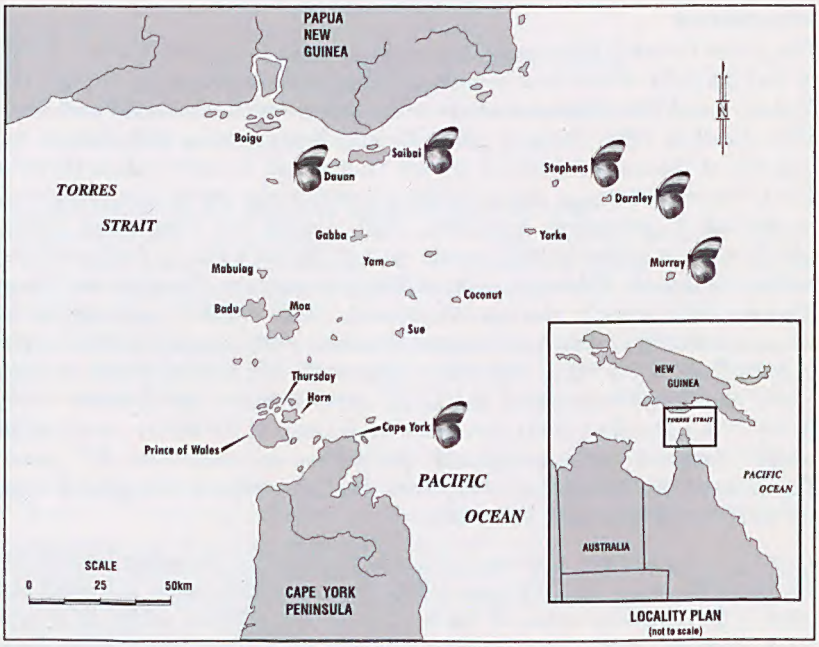
Species of the amathusiine genus *Taenaris* Hübner known to occur in Australia, predominantly from Torres Strait, are reviewed and illustrated. *T. myops kirschi* Staudinger is recorded for the first time in Australia from four male specimens collected on Dauan Island, Torres Strait. A female specimen of the satyrine *Elymnias agondas melanippe* Grose-Smith also collected from Dauan Island represents the first record of this taxon from Australia. The high degree of variation observed in the external facies of *Taenaris* from Torres Strait and reliable taxonomic separation of female specimens are discussed. *Taenaris*-like forms of the papilionid, *Papilio aegeus ormenus* Guérin-Méneville and *E. a. melanippe* from Torres Strait and Dauan Island respectively are illustrated and reviewed. The form of *P. a. ormenus* from Torres Strait that is most similar to *Taenaris* spp is identified as form *ormenus* Guérin-Méneville variety *onesimus* Hewitson.

Introduction

The genus *Taenaris* Hübner, 1819 contains around 25 species (Parsons 1998) of owl butterfly which have a wide distribution from Malaysia, through the Moluccas and New Guinea, and out to the Solomons (Corbet and Pendlebury 1992, Parsons 1998, Tennent 2002). Despite this extensive distribution, the majority of species are confined to New Guinea and its outer islands (Brooks 1950, Parsons 1998), i.e. east of Weber's line (Brooks 1950). The exceptions to this are *T. horsfieldii* Swainson, 1820 (Corbet and Pendlebury 1992), which is the only species that occurs west of Weber's line in the Sundaland region (Malaysia, Palawan, western Borneo, southern Sumatra and Java) (Brooks 1950), and *T. phorcas* (Westwood, 1958) which is endemic to the Bismarck and Solomon Archipelagos (Parsons 1998, Tennent 2002). South of New Guinea, *Taenaris* occurs in Torres Strait and extends south to Cape York, Australia (Waterhouse and Lyell 1914, Johnson and Johnson 1991, Braby 2000). Brooks (1950) provided a useful map of the Malay Archipelago which illustrates the geographical distribution and limits of the genus. *Taenaris urania* (Linnaeus, 1758) from the Moluccas is the generic type species (Waterhouse and Lyell 1914).

Taenaris are attractive, medium to large butterflies (♂♂ forewing lengths 40-56 mm with larger ♀♀; Parsons 1998), predominantly white in colour but often with extensive areas of black, grey or tan (Brooks 1950, D'Abrera 1978, Parsons 1998). They characteristically have large round hindwings, with striking ocelli that are predominantly yellow in colour with central blue-black pupil areas. The ocelli are particularly obvious on the verso surface and

are considered to contribute to their aposematic colour patterns (Merrett 1996). The wings of *Taenaris* butterflies are relatively fragile and tear easily. Both sexes of many *Taenaris* species are highly polymorphic, so much so that their variability can tend to overlap between some species, making delimitation of these difficult, especially female specimens (Brooks 1950, Parsons 1991, 1998), although Brooks (1950) indicated that structural differences between the genital armatures of the males could be reliably used to identify males of *Taenaris* spp. Based on external facies, *Taenaris* males are characterised by having the inner margin of the forewing convex or bowed near the base, curving to the tornus, with tufts of long androconial hairs at the base of the upper side hindwing and an androconial hair-streak along the hindwing dorsal inner margin. Some species also have androconial scales underlying this inner marginal hair-streak (Brooks 1950, Parsons 1998, Braby 2000). Females typically have much broader wings with a straight forewing inner margin and lack androconial hairs and scales. Many species are believed to form Müllerian mimetic complexes; these complexes are also thought to incorporate, as probable Batesian mimics, pale forms of *Papilio aegeus* Donovan, 1805 (Paplionidae) and *Elymnias agondas* (Boisduval, 1832) (Nymphalidae) (Parsons 1984, Braby 2000).

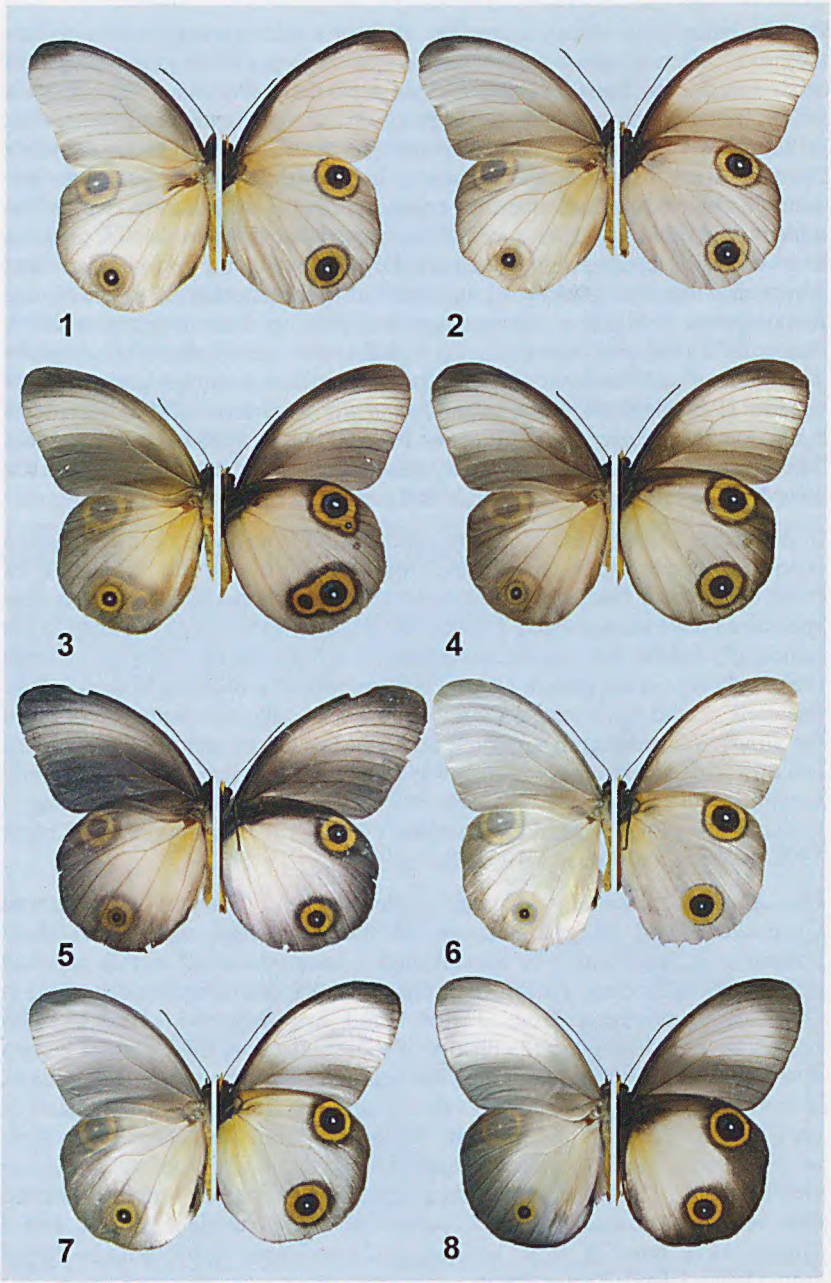


Map 1. Map of Torres Strait, Queensland showing positions of main or inhabited islands with known locations for *Taenaris* spp indicated.

Despite being large showy butterflies, *Taenaris* are surprisingly secretive as they most often frequent the well shaded understorey of dense primary and secondary forest, from low to moderate elevations (Parsons 1998, Tennent 2002). In the understorey they often perch on the upper surface of vegetation, sometimes close to the ground (Parsons 1998, Tennent 2002) and quite often fly only when disturbed. Consequently, individuals are not often observed. Adult *Taenaris* primarily feed on rotting fruit and seeping sap within the understorey, although Parsons (1984) reported two species imbibing juices from damaged cycad fronds and nuts. Of the species for which larval host plants are recorded almost all of these utilise monocotyledons, with the gymnosperm family Cycadaceae also recorded as a host (Parsons 1998, Braby 2000). Despite *Taenaris* being a well known genus, the life histories of a number of species have only just been described over the last couple of decades (Parsons 1984, Johnson and Johnson 1991, Merrett 1996). Larvae of many species are gregarious (Parsons 1984). Parsons (1984) considered that *Taenaris* are normally continuously brooded, but reported pupal diapause occurring during times of prolonged dry periods.

In Australia, *Taenaris* are primarily confined to the northernmost and eastern islands of Torres Strait, Queensland (Map 1), and due to the remoteness of these islands and the secretive nature of the adult butterflies, relatively few specimens have been collected. Early historical specimens (prior to 1911) are principally held in the Australian Museum and Museum of Victoria, although there are a few in the British Natural History Museum (NHM), London. After this early period there were no further specimens collected from Torres Strait for almost 75 years until airstrips were constructed on many of the islands and efficient travel to these islands was possible. Since the 1980s, many more specimens of *Taenaris* have been collected in Torres Strait including a specimen from the Australian mainland (Wood 1987, Lambkin and Knight 1990, Johnson and Johnson 1991, Braby 2000).

Due to the temporally disjunct collections of *Taenaris* in northern Queensland, and since almost all of the knowledge relating to these butterflies is fragmentary or unpublished, I have attempted in this paper to pull together this data. Therefore in this work, the *Taenaris* spp occurring in Queensland, primarily from Torres Strait are reviewed. This includes presenting and discussing the history of their collection, their current known distributions, and some taxonomic difficulties within the group. In addition, information on their habits, prevalence and seasonality in Queensland is provided. I also report and illustrate for the first time the *Taenaris*-like form of *Papilio aegeus ormenus* Guérin-Méneville, 1831 variety *onesimus* Hewitson, 1858 that occurs in Torres Strait. Lastly, I report and illustrate the first records for Australia of *T. myops kirschi* Staudinger, 1887 and a *Taenaris*-like form of *E. a. melanippe* Grose-Smith, 1894, both collected from Dauan Island, Torres Strait.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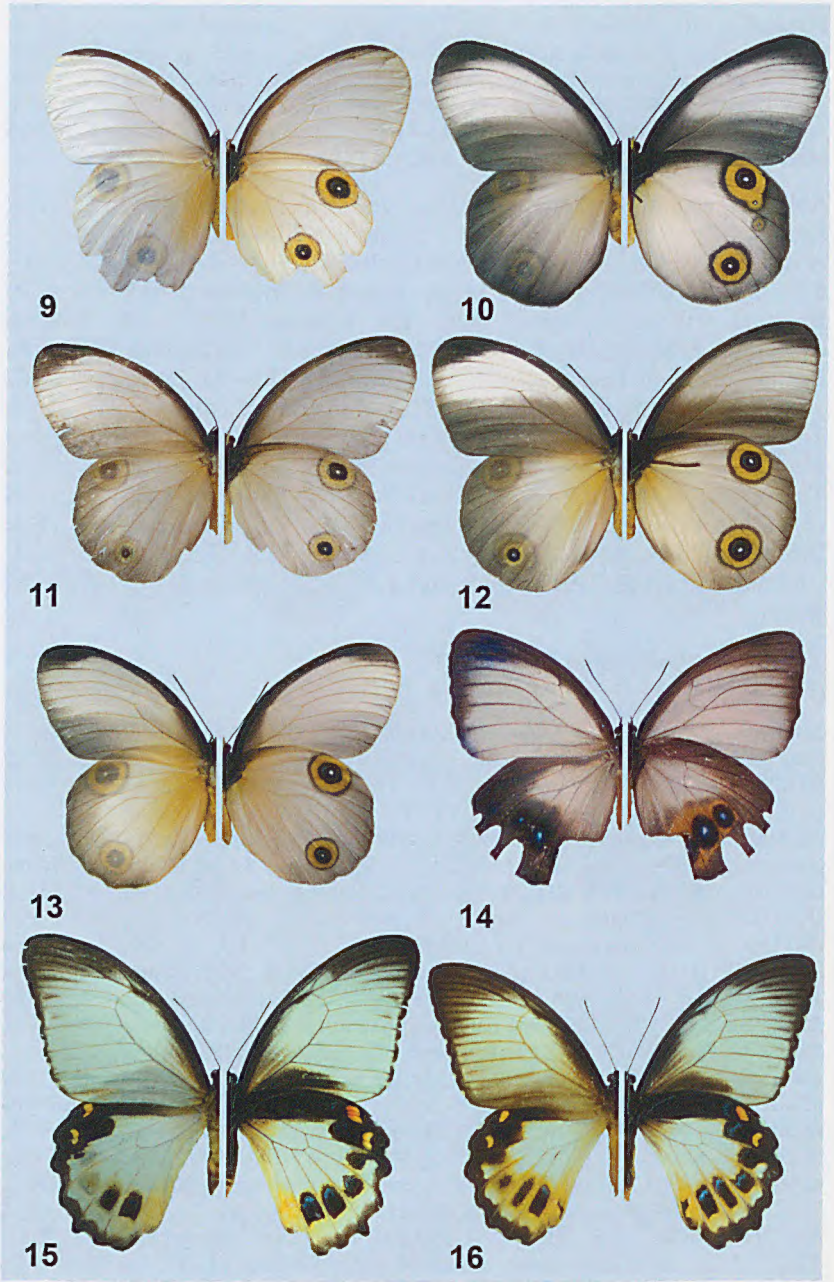
Figs 1-8 (Left). *Taenaris* spp males: Torres Strait, Queensland. All figures not to scale: upperside left, underside right [forewing lengths, in mm, in square brackets]. (1-5) *T. artemis jamesi*: (1) Dauan Island, 21.iv.2001 [46], AIK; (2) Murray Island, 25.iv.1989 [50], AIK; (3) Dauan, 28.ii.2006 [45], AIK; (4) Dauan, 25.iv.2000 [43], AIK; (5) Dauan, 9.iii.2006 [47], AIK; (6-8) *T. myops kirschi*: (6) Dauan, 6.iii.2006 [48], AIK; (7) Dauan, 10.iii.2006 [47], AIK; (8) Dauan, 24.ii.2006 [49], AIK.

Abbreviations of collectors, collections and their locations are: AIK – A.I. Knight; AJJ – A.J. Johnson; AM – Australian Museum, Sydney; ANIC - Australian National Insect Collection, Canberra; CEM – C.E. Meyer; CGM – C.G. Miller; CGMC – C.G. Miller collection, Lennox Head; EH – E. Hamacek; HE – H. Elgner; IRJ – I.R. Johnson; IRJC – I.R. Johnson collection, Brisbane; JWCD – J.W.C. d'Apice; KB – K. Beattie; KBC – K. Beattie collection, Brisbane; KH – K. Houston; MDB – M. De Baar; MDBC – M. De Baar collection, Brisbane; MTQ – Museum of Tropical Queensland, Townsville; MV – Museum of Victoria, Melbourne; NHM – Natural History Museum, London; PSV – P.S. Valentine; PSVC - P.S. Valentine collection, Townsville; QPIFC – Queensland Primary Industries and Fisheries collection, Brisbane; SJJ – S.J. Johnson; SSB – S.S. Brown; SSBC – S.S. Brown collection, Bowral; TAL – T.A. Lambkin; TLF - T.L. Fenner; TLIKC - Joint collection of T.A. Lambkin and A.I. Knight, Brisbane; WWB - W.W. Brandt.

Taenaris artemis jamesi Butler, 1877

(Figs 1-5, 11-13)

Material examined or reviewed. MAINLAND QUEENSLAND: 1♂, North Queensland (NHM); 1♀, Lockerbie, Cape York, 8.vi.1990 SJJ (MTQ). TORRES STRAIT: 6♂♂, 1♀, Darnley Island, 13.iv.1910 (1♂), 18.iv.1910 (1♂), 21.iv.1910 (1♂), 22.iv.1910 (3♂♂), 18.v.1910 (1♀) HE (MV); 3♂♂, 2♀♀, same data except .xii.1909 (1♀), 22.iv.1910 (1♂, 1♀), 18.v.1910 (1♂), 19.v.1910 (1♂) (AM); 1♂, same data except 6-12.iv.1984 JWD (ANIC); 1♂, 1♀, Murray Island (NHM); 1♂, same data except 11-12.v.1995 SJJ (MTQ); 3♂♂, same data except 13-17.iv.1993 SJJ & IRJ (MTQ); 4♂♂, same data except 2.iv.1989 (3♂♂), 3.iv.1989 (1♂) IRJ & AJJ (MTQ); 1♂, same data except 3.iv.1989 IRJ & AJJ (IRJC); 1♂, 1♀, same data except 20.iv.1989 (1♀), 17.iv.1993 (1♂) SJJ & IRJ (PSVC); 3♂♂, same data except 17.iv.1993 (1♂), 17.iv.1994 (2♂♂) PSV (PSVC); 2♂♂, same data except 4.iv.1986 MDB (MDBC); 4♂♂, 1♀, same data except 30.iii.1986 (1♀), 22-25.iv.1989 (3♂♂), 26.iv.1996 (1♂) TAL (TLIKC); 1♂, same data except 4.iv.1986 KB (KBC); 7♂♂, same data except 24.iv.1989 (1♂), 25.iv.1989 (3♂♂), 22-25.iv.1989 (3♂♂) AIK (TLIKC); 2♂♂, same data except 6-10.iv.2001 SSB & CEM (SSBC); 1♂, same data except 1-7.vi.1986 JWD (ANIC); 3♂♂, Dauan Island, 2.iv.2004 PSV (PSVC); 3♂♂, same data except 2.iv.2004 (2♂♂), 3.iv.2004 (1♂) SJJ (MTQ); 2♂♂, same data except 1-8.iv.2009 MDB (MDBC); 3♂♂, same data except 5.iv.2009 CGM (CGMC); 7♂♂, 5♀♀, same data except 6.i.2006 (1♀), 11.i.2006 (2♀♀), 2.iv.2009 (1♂), 3.iv.2009 (1♂, 1♀), 5.iv.2009 (3♂♂), 6.iv.2009 (2♂♂), 6.i.2010 (1♀) TAL (TLIKC); 17♂♂, 7♀♀, same data except 25.iv.2000 (1♂), 7.v.2000 (1♀), 21.iv.2001 (1♂), 4.i.2006 (1♀), 23.ii.2006 (1♂), 24.ii.2006 (1♂), 28.ii.2006 (2♂♂), 6.iii.2006 (1♂,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Figs 9-16 (Left). *Taenaris* spp. females, and *Taenaris*-like forms of *Elymnias agondas melanippe* and *Papilio aegeus ormenus*: Torres Strait, Queensland. All figures not to scale: upperside left, underside right [forewing lengths, in mm, in square brackets]; (9) *T. catops turdula*: Saibai Island, 1.iii.1996 [50], TAL; (10-13) *T. artemis jamesi*: (10) Dauan Island, 11.iii.2006 [51], AIK; (11) Dauan, 11.i.2006 [51 mm], TAL; (12) Dauan, 6.iii.2006 [54], AIK; (13) Dauan, 9.iii.2006 [57], AIK; (14) *E. a. melanippe* female: Dauan, 4.iv.2009 [44], MDB; (15-16) *P. a. ormenus* females: (15) Dauan, 6.i.2006 [65], TAL; (16) Murray Island, 1.v.1999 [60], AIK.

1♀), 8.iii.2006 (1♂), 9.iii.2006 (6♂♂, 1♀), 10.iii.2006 (2♂♂), 10.ii.2008 (1♀), 11.iii.2006 (1♂, 1♀), 19.xii.2009 (1♀) AIK (TLIKC); 1♀, same data except 13-19.iv.2001 SSB (SSBC); ♂, ♀, Saibai Island, 20.iv.2000 AIK (TLIKC); 4♂♂, Stephens Island, 7.v.1985 (3♂♂), 11.v.1985 (1♂) CGM (CGMC). PAPUA NEW GUINEA: 1♀, Lae, 20.ix.1951, WWB, determined TLF 1975 (ANIC); 1♀, Subitana (Central District) 1800 ft, 11.viii.1949 WWB, ID by WWB (ANIC); 1♀, same data except 16.viii.1949.

Taenaris artemis (S.C. Snellen van Vollenhoven, 1860) occurs on the western side of New Guinea from Gebe, Waigeo, Misool, Aru, Salawati, Mioswaar, Biak and Japen, throughout New Guinea, including the outlying islands of Papua New Guinea and south through Torres Strait to the tip of Cape York Peninsula, Queensland (Brooks 1950, Parsons 1998, Braby 2000). The type locality is New Guinea (Waterhouse and Lyell 1914, Edwards *et al.* 2001). In Papua New Guinea it is widespread and occurs in a variety of habitats, including primary and secondary forest, and eucalypt savannah (Parsons 1998). Populations from southern Papua New Guinea and Torres Strait are assigned to *T. a. jamesi* (Brooks 1950, Parsons 1998). The type locality for *T. a. jamesi* (originally described as *Tenaris jamesi* Butler) is Yule Island, New Guinea (Butler 1876, Parsons 1998). Prior to Wood (1987) collecting three specimens of *T. a. jamesi* on Murray Island in Torres Strait in 1984/85 (Map 1), all previous known specimens from Australia predated 1911. As mentioned above, these earlier specimens include a male and female from '*Murray Island*' housed in the NHM (the types of *T. a. zetes*, Brooks 1944) and a male also in the NHM from '*N. Queensland*', the type of *T. a. queenslandicus* (Rothschild 1916). The remainder of these specimens, 5 in the AM and 7 in the MV (although Waterhouse and Lyell [1914] indicated a total of only 11) were all collected on Darnley Island (Map 1) by Hermann Elgner in 1909/10 (Moulds 1977, Dunn 2007).

In Queensland *T. a. jamesi* is primarily restricted to the islands in the northern and eastern sectors of Torres Strait, and is known with certainty from one female collected from Lockerbie at Cape York (Johnson and Johnson 1991, Braby 2000) (Map 1). The female specimen purportedly collected at Bamaga at Cape York in October 1980 by the late F.G. Sattler (now in the S. Ginn collection, Sydney) mentioned in Braby (2000) appears to be mislabelled and likely originated from Mumeng in Papua New Guinea. S. Ginn (AM) has recounted the movements of Sattler over that period and

Sattler was not known to have collected at any location in Queensland north of the Claudie River, although during this same period he visited Papua New Guinea and collected other *Taenaris* specimens while there. Therefore based on this evidence, Sattler's Bamaga record for *T. a. jamesi* is almost certainly erroneous. The precise collection details for the 'historic' male specimen housed in the NHM labelled '*N. Queensland*' (Brooks 1950, Braby 2000) are unknown and it might well have originated from the area around Lockerbie. Current Torres Strait collection records indicate that *T. a. jamesi* is restricted to Murray, Darnley and Stephens Islands in the very east of the strait, and to Saibai and Dauan Islands in the north, close to the southern coast of the Western Province of Papua New Guinea (Map 1). Interestingly, there has been only one Darnley Island specimen (1♂, 6-12.iv.1984 JWCD) of *T. a. jamesi* collected more recently than Elgner's records from a century ago, which attests to the secretive habits of these butterflies, although what is believed to be this species has been observed on the island on a number of occasions (De Baar [1988] and *unpublished data*; Johnson *unpublished data*). By far, the majority of specimens has been observed and collected from Dauan and Murray Islands.

In Torres Strait, *T. a. jamesi* is only known during the wetter months, viz. January to June. Little is known of the seasonality of the species in Torres Strait as there are no collection records for this species over dry seasons, mainly because the region is rarely visited by entomologists during the drier periods. Some correlation might be drawn from the work of Parsons (1984), who studied the ecology of *T. onolaus* Kirsch in Papua New Guinea. He found that females of this species were generally short lived and that the species was continuously brooded all year round, with large fluctuations in population numbers directly related to extremes of wet and dry periods. In addition, Parsons (1984) found that prolonged dry periods produced diapause in pupae of *T. onolaus*. Thus in Queensland *T. a. jamesi* may be continuously brooded, with populations normally increasing in numbers during the wet season.

In Australia, *T. a. jamesi* has been observed in dense primary or secondary vine thicket often with a prominent *Pandanus* S. Parkinson (Pandanaceae) component (Johnson and Johnson 1991). In Torres Strait, many specimens have been collected quite close to habitation, in the understorey of vine thicket, under mango trees (*Mangifera indica* L., Anacardiaceae) or in overgrown or abandoned banana (*Musa* spp, Musaceae) gardens. When flying in dense vegetation, they are especially adept at weaving through undergrowth and between tree trunks which makes them difficult to capture. On Murray and Dauan Islands females have also been observed swiftly traversing open ground such as over roads, between two and four metres above ground level. The species is most easily collected while resting on foliage or imbibing from over-ripe or fermenting fallen fruit and are most often only observed following disturbance from their perching or imbibing

sites. Recorded adult fruit hosts in Torres Strait are *Ficus* L. (Moraceae), *Terminalia catappa* L. (Combretaceae), *Musa* L. (Musaceae) and *M. indica*. Fruit feeding by adult butterflies on Dauan Island has frequently been observed in the mornings at around 0800hrs EST and just prior to dusk, after 1730hrs EST. Johnson and Johnson (1991) recorded *Pandanus* as a larval host for *T. a. jamesi* from material they collected on Murray Island, Torres Strait, while in Papua New Guinea, Parsons (1984) and Merrett (1996) recorded *P. odorus* Ridl. and *Cocos nucifera* (L.) (Arecaceae) as hosts.

***Taenaris catops turdula* Fruhstorfer, 1914**
(Fig. 9)

Material examined or reviewed. QUEENSLAND (TORRES STRAIT): ♀, Darnley Island, 13.v.1910 HE (AM); ♀ same data except 18.v.1910 (MV); ♀, Saibai Island, 1.iii.1996 TAL (TLIKC).

Taenaris catops (Westwood, 1851) is known from Gebe, Waigeo, Misool, Aru, Salawati, Mioswaar, Roon, Japen, mainland New Guinea, Torres Strait and various outlying islands of Papua New Guinea (Brooks 1950, Parsons 1998). The type locality for *T. catops* is Aru (Brooks 1950, Parsons 1998). Despite it being the most widespread and the most frequently encountered *Taenaris* species in New Guinea (Brooks 1950, Parsons 1984), there are still only three specimens known from Torres Strait (Waterhouse and Lyell 1914, Braby 2000), i.e. from Darnley and Saibai Islands (Waterhouse and Lyell 1914, Braby 2000) (Map 1). These three specimens are similar in facies, being predominantly white with a pair of ocelli on each hindwing (Fig. 9). Based on the pale colouration of the two Australian specimens (Waterhouse and Lyell 1914) known to Brooks (1950) at that time, he tentatively assigned them to *T. c. turdula*, which is principally found in the southern provinces of Papua New Guinea; the type specimen being from Yule Island, Papua New Guinea. Therefore its distribution encompasses the Western Province of Papua New Guinea which is a very short distance from Saibai Island. The Saibai Island specimen collected in March 1996 is also pale and was subsequently assigned to *T. c. turdula* by Braby (2000). Nothing is known of the habits, biology or seasonality of *T. c. turdula* in Torres Strait except that the specimen from Saibai Island was collected in March 1996 as it flew swiftly, about two meters above ground level along the landward side of mangroves. In Papua New Guinea, larvae of *T. c. turdula* feed on a range of host plants, *Cordyline terminalis* (L.) (Liliaceae), *Phaius tancarvilleae* (Banks ex L'Her.) Blume (Orchidaceae), *Musa* sp., *Areca catechu* L. and *Caryota rumphiana* (Arecaceae) (Parsons 1984, 1998). Despite the paucity of material collected from Torres Strait, it is possible that the species locally occurs on Darnley and Saibai Islands, as both are largely unexplored, have potential host plant species and are infrequently visited by butterfly collectors. In addition, it is possible that *T. c. turdula* in Torres Strait might not readily frequent areas near habitation, which might explain its apparent scarcity in Torres Strait compared to *T. a. jamesi* (although *T. catops* has

been collected in gardens on the edge of villages in Papua New Guinea, T.L. Fenner, *unpublished data*).

***Taenaris myops kirschi* Staudinger, 1887**
(Figs 6-8, 10)

Material examined. QUEENSLAND (TORRES STRAIT): 4♂♂, Dauan Island, 23.ii.2006 (♂), 24.ii.2006 (♂), 6.iii.2006 (♂), 10.iii.2006 (♂) AIK (TLIKC). PAPUA NEW GUINEA: 1♀, Lae, 14.vi.1951, WWB, ID by WWB (ANIC); 1♀ same data except 6.ix.1951, determined TLF 1975; 1♀, Angoram (Sepik District) 20 ft, 26.iv.1950, WWB, ID by WWB (ANIC).

The distribution of *T. myops* (C.&R. Felder, 1860) includes Waigeo, Misool, Aru, Salawati, Mioswaar, Biak, Japen, mainland New Guinea and various islands outlying Papua New Guinea (Brooks 1950, Parsons 1998). The type locality is Aru (Brooks 1950, Szent-Ivany and Barrett 1956). Parsons (1998) described *T. myops* as being widespread in Papua New Guinea with the race *T. m. kirschi* principally occurring along the southern coast, which includes the Western Province, directly opposite and very close to the northern Torres Strait islands. The type locality of *T. m. kirschi* is Port Moresby, Papua New Guinea (Parsons 1998). In Papua New Guinea it primarily occurs in the central district of Papua in eucalyptus savannah and monsoon forest (Szent-Ivany and Barrett 1956). As its distribution encompasses the area of Papua New Guinea adjacent to Torres Strait, it is not surprising that four males of *T. m. kirschi* were collected (AIK) on Dauan Island in February and March 2006 (Map 1). My placement of these specimens into subspecies *kirschi* is based solely on geographical grounds. The four specimens were all collected, together with *T. a. jamesi*, as they imbibed on fermenting mango fruit under mango trees at the village edge. No further specimens have been observed on Dauan Island since, despite visits by a number of butterfly workers. Therefore it is unknown whether *T. m. kirschi* is resident on the island or whether it sporadically invades from the Papua New Guinea mainland, although the latter seems improbable as *Taenaris* spp are generally secretive and of a frail nature, and are mostly reluctant to fly great distances. At Port Moresby in Papua New Guinea, larvae of *T. m. kirschi* were recorded feeding on *Musa* spp. (Szent-Ivany and Barrett 1956).

***Elymnias agondas melanippe* Grose-Smith, 1894**
(Fig. 14)

Material examined. QUEENSLAND (TORRES STRAIT): ♀, Dauan Island, 4.iv.2009 MDB (MDBC).

Elymnias agondas (Boisduval) occurs to the west of New Guinea (Seram, Waigeo, Aru and Salawati), throughout mainland New Guinea, including some of its islands as *E. a. melanippe*; and into the northern coastal area of Cape York Peninsula, Queensland as *E. a. australiana* Fruhstorfer (Parsons 1998, Braby 2000). It is found primarily in or near rainforest where its host plants *Calamus* spp (rattan or lawyer palms: Arecaceae) mostly grow

(Braby 2000). *E. a. melanippe* predominantly occurs in Papua New Guinea and on its islands, Normanby, Woodlark and Daru (Parsons 1998) and its type locality is indicated as 'German New Guinea' (Parsons 1998). The species was not known from Torres Strait until April 2009 when a female of *E. a. melanippe* was collected by M. De Baar on Dauan Island, Torres Strait (Map 1) as it flew close to the village edge, near monsoonal vine forest. This specimen constitutes the first Australian record of *E. a. melanippe* and the first record of *E. agondas* in Torres Strait. The specimen collected was of the form that resembles *Taenaris* (Fig. 14), the same form that Parsons (1998) reported as a 'mimic' of various *Taenaris* species throughout New Guinea. Although *Calamus* spp have not been observed on Dauan, other Arecaceae occur naturally on the island (e.g. *Nypa fruticans* Wurmb., *C. nucifera* and *Ptychosperma macarthurii* H. Wendland)

***Papilio aegeus ormenus* (Guérin-Méneville), 1831**
form *ormenus* Guérin-Méneville variety *onesimus* Hewitson, 1858

(Figs 15, 16)

Material examined. QUEENSLAND (TORRES STRAIT): 1♀ Dauan Island, 11.v.2001 AIK (TLIKC); 2♀♀ same data except 6.i.2006, 5.iv.2009 TAL; 1♀ same data except 1-8.iv.2009 MDB (MDBC); 1♀ Darnley Island, 1-2.iv.1987 MDB (MDBC); 1♀ Murray Island, 1.v.1999 AIK (TLIKC); 1♀ same data except (Mer), 29.iii.-4.iv.1986 MDB (MDBC); 1♀ Moa Island (St Pauls Mission), 10-16.ii.1986 KH & EH (QPIFC).

Papilio aegeus Donovan occurs across Torres Strait as two subspecies, demarcated roughly in the central area of the strait, with the nominate race, *P. a. aegeus* Donovan found on and south of the central island group (Moa, Badu and Maubiag Islands) and *P. a. ormenus* predominantly occurring north and east of this group, although specimens considered to be *P. a. ormenus* are also known from the central island group (Map 1). Braby (2000) regarded the central area of Torres Strait to be a hybrid zone for the two subspecies, and indicated that some specimens from this central island group can be variable, possessing intermediate characters and consequently are difficult to place. In general, the females of both subspecies can be highly polymorphic, particularly so for *P. a. ormenus* and especially in Papua New Guinea (Parsons 1998). Hancock (1983) reviewed the systematics and biogeography of *P. aegeus* (as *Princeps aegeus* [Hancock 1983]) and concluded that there were primarily three female forms of *P. a. ormenus*, of which one form, *ormenus* Guérin-Méneville, variety *onesimus* Hewitson is a pale *Taenaris*-like morph with white forewings and darker costal and apical borders (Figs 15, 16). Similarly Braby (2000) reported three forms in general for *P. a. aegeus*, with form *beatrix* Waterhouse being roughly analogous to the more northern *ormenus* form of *P. a. ormenus*, although a true *Taenaris*-like form (strictly comparable to variety *onesimus*) is not known within females of *P. a. aegeus*.

Discussion

Parsons (1991, 1998) and D'Abrera (1978) emphasised the extreme variation within *T. artemis*, *T. catops* and *T. myops*, and because of this variation, Parsons (1998) considered that Brooks (1950), in his review of *Taenaris,* could not justify listing 20, 26 and 13 subspecies respectively of such variable taxa. Parsons (1998) reviewed *T. artemis* across its range and due to its variability he accepted only six subspecies for Papua New Guinea, and even placed some doubt on the validity of these six, still referring to them as 'supposed'. In Australia, because of this variability, Wood (1987) and Braby (2000) consequently treated *T. a. zetes* Brooks from Murray Island, Torres Strait and *T. a. queenslandicus* Rothschild from north Queensland as junior synonyms of *T. a. jamesi*. Additionally, Parsons (1998) recognised only 11 subspecies of *T. catops* and just three *T. myops* subspecies from Papua New Guinea.

In support of his own review of the above three species and their subspecies, Parsons (1998) indicated that 'Müllerian mimetic associations' and 'the existence of clinal variation' contributed to the variability shown by these species throughout their range. Parsons (1991, 1998) indicated that the variation in their facies was ostensibly influenced by the overall similar facies of their mimetic *Taenaris* counterparts (interspecific and intraspecific), and other mimicry 'models' occurring in the same geographical area. In addition, he proposed that this particular influence on variation even caused 'females to closely resemble their respective males at any given locality' (Parsons 1991). Moreover, Brooks (1950) who first reviewed the genus also suggested that *T. myops* and *T. artemis* 'both conform to a typical geographical pattern'. Therefore, Parsons (1998) considered that mimetic and clinal influences on local populations, combined with an overall degree of natural variability of these three species justified his reluctance to adopt many, if not all of the geographical races, in particular those of *T. artemis*.

Despite Brooks (1950) and Parsons (1998) proposing that mimicry and clines might strongly influence the variation observed in *Taenaris* species, Szent-Ivany and Barrett 1956 found that the many individuals of *T. myops* that they reared on banana at Port Moresby, Papua New Guinea showed high variability in the extent of wing colouration and in the size of the ocelli. Similarly in Torres Strait, *T. a. jamesi* and *T. m. kirschi* are highly variable (Figs 1-8), even in series of specimens from small islands such as Dauan. Thus, this high degree of variation recorded in confined geographical areas such as Dauan Island places some doubt on the proposition by Parsons (1991, 1998) and Brooks (1950) that mimicry and clinal variation could strongly influence the variability of these two species.

Identification of the three *Taenaris* species that occur in Torres Strait is mostly easy, and males in particular of each species can be clearly delineated, more so than the females. Males of *T. catops* have typically short, stubby

forewings (the wings are almost square in cross section), prominent dark scaling along the radial, medial and cubital veins of the forewing upper (Parsons 1998), and the forewing inner margin is always devoid of dark scaling (which the other two species almost always have) (Parsons 1998). In addition, both sexes of *T. catops* can be easily separated from other members of the genus by the position of hindwing ocelli, which in *T. catops* is set in further from the termen in the subtornal area, while in other *Taenaris* species, the ocelli sit in the tornal area of the hindwing (Waterhouse and Lyell 1914). *Taenaris myops* males always possess dark androconial scales underlying the inner marginal hair-streak on the hindwing upper (Brooks 1950, Parsons 1998) (Figs 6-8), while Parsons (1998) indicated that the males of *T. artemis*, in addition to lacking the androconial inner marginal scales of *T. myops*, are generally paler and more tan-brown to grey-brown in colour as opposed to the dark brown, almost black markings of *T. myops*, although some individuals of *T. a. jamesi* from Torres Strait can have grey-black colouration (Fig. 5). Moreover, specimens of *T. a. jamesi* known from Torres Strait are highly variable in wing colouration, extent of colouration and wing shape (Figs 1-5).

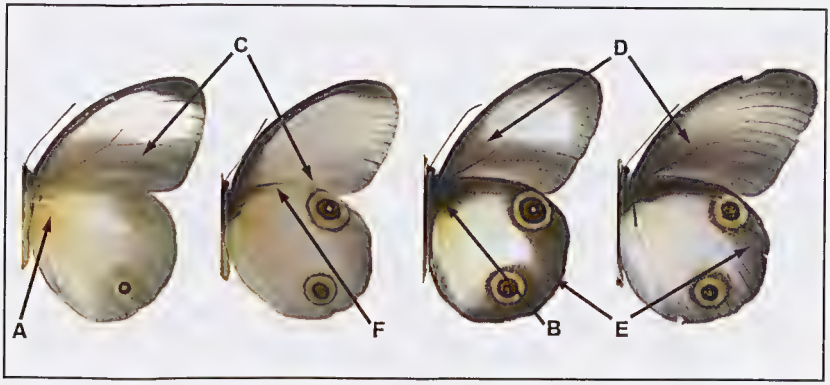

Fig. 17. Principal wing features (not including dark androconial scales) considered useful by Brooks (1950), D'Abrera (1978) and Parsons (1991, 1998) (see Discussion) in identifying *Taenaris artemis jamesi* and *T. myops kirschi*. All figures not to scale [forewing lengths, in mm, in square brackets]. A: yellow basal area of upperside hindwing; B: hindwing costal border not terminating at wing base; C: position of forewing inner margin; D: forewing cell; E: dark-brown almost black markings; F: absence or reduction of hindwing costal border. Specimen data, left to right: *T. a. jamesi* female upperside, Dauan Island, 9.iii.2006 [57], AIK; *T. a. jamesi* female underside, Dauan, 6.iii.2006 [54], AIK; *T. m. kirschi* male underside, Dauan, 24.ii.2006 (49), AIK; *T. a. jamesi* male underside, Dauan, 9.iii.2006 [47], AIK.

Among the females of the three *Taenaris* species in question, only the female of *T. catops* (Fig. 9) can be reliably identified (see above). A number of workers have attempted to separate females of *T. artemis* and *T. myops* on the

basis of wing colouring. Brooks (1950) indicated that the female of *T. artemis* could often be distinguished from allied species by the presence of a yellow area below the base of the upperside hindwing (Fig. 17A), and dark forms of *T. myops* could be separated from allied dark forms by the costal border of the hindwing underside not terminating at the wing base but expanding around into the hindwing (Fig. 17B). In addition Brooks (1950) reported that the overall markings of *T. artemis* tend to be 'light' in colour. Finally in his review of the genus he summarised the difficulty in reliably separating the two species and stated that the 'females of some of the races of *T. artemis* and *T. myops* so closely resemble each other that it is impossible to describe characters which separate them'. D'Abrera (1978) listed two characteristics that he considered peculiar to female *T. artemis*, the first was the top edge of the forewing band in the inner marginal space which, when present, is more or less parallel with the dorsum (Fig. 17C), and secondly, where the marginal band enters the cell it never completely fills it but leaves a lighter space that more or less follows the shape of the vein which closes off the cell (Fig. 17D). Parsons (1991) considered that *T. artemis* could be distinguished from *T. myops* by its paler colour, 'more tan-brown compared to the dark-brown, almost black markings of *T. myops*' (Fig. 17E), (even though some individuals of *T. a. jamesi* from Torres Strait can be almost black in colouration Fig. 12), and in *T. artemis* by the colour not fully filling the forewing cell (Fig. 17D), whereas it does in *T. myops*. Later, Parsons (1998) reported that the yellow sub-basal area of the upper side hindwing of *T. artemis* (as Brooks [1950] reported) (Fig. 17A) was not a useful character to distinguish *T. artemis*, as the hindwing of *T. myops* is also frequently sub-basally yellow. Nonetheless, Parsons (1998) regarded the most useful characters that distinguish females of *T. artemis* from females of *T. myops* were the narrower dark brown forewing inner marginal band (or absence of forewing inner marginal band) of *T. artemis* (Fig. 17C), and the hindwing inner margin of *T. myops* being narrowly bordered with dark brown (Fig. 17B), but usually completely white in *T. artemis* (Fig. 17F).

Accordingly, using information provided by Brooks (1950), D'Abrera (1978) and Parsons (1991, 1998), my assessment of the female *Taenaris* specimens reviewed in this paper, predominantly from Torres Strait, and of a small series of six female *Taenaris* from southern Papua New Guinea, purportedly identified as *T. a. jamesi* and *T. m. kirschi* (ANIC), places doubt on the reliability of many if not all of the above characters when used to separate either sex of the two species. Based on my assessment I found no helpful, consistent or reliable characters (as illustrated in Fig. 17) that could be dependably used to identify females of the two species (including the six specimens from Papua New Guinea). In effect, for pale morphs of both species, even male specimens would be difficult to distinguish using only these characters. Based on this, and the fact that only four out of a total

of 39 male *Taenaris* specimens collected on Dauan Island are *T. m. kirschi*, I have tentatively classified all females specimens examined from Dauan Island and the remainder examined from Saibai, Darnley and Murray Islands, including the specimen from Lockerbie as *T. a. jamesi*.

The reporting here of female *P. aegeus ormenus* form *ormenus*, variety *onesimus* from Torres Strait constitutes the first recognition of this *Taenaris*-like variety from Australia and here, two specimens are first illustrated from Torres Strait. Moreover, due to the intensity of butterfly collecting undertaken on Dauan island since the early 2000s it seems likely to surmise that the first capture of *E. a. melanippe* on the island in April 2009, in conjunction with the specimen being quite worn, likely constitutes a vagrant from nearby Papua New Guinea. In addition, because of the capture of four relatively fresh specimens of *T. m. kirschi* from Dauan Island in 2006 and none since, it might be possible that vagrant populations of this species from Papua New Guinea from time to time may become established on Dauan Island. Conversely, due to the fragility of *Taenaris* butterflies and their sedentary behaviour, and the fact that many Torres Strait islands (Map 1), including Dauan, are still largely unexplored because of the nature of their terrain, it is feasible that *E. a. melanippe* and *T. m. kirschi* might be established on Dauan Island.

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